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A Primer on Parsimonious Health Information Systems for Low- and Middle-Income Countries

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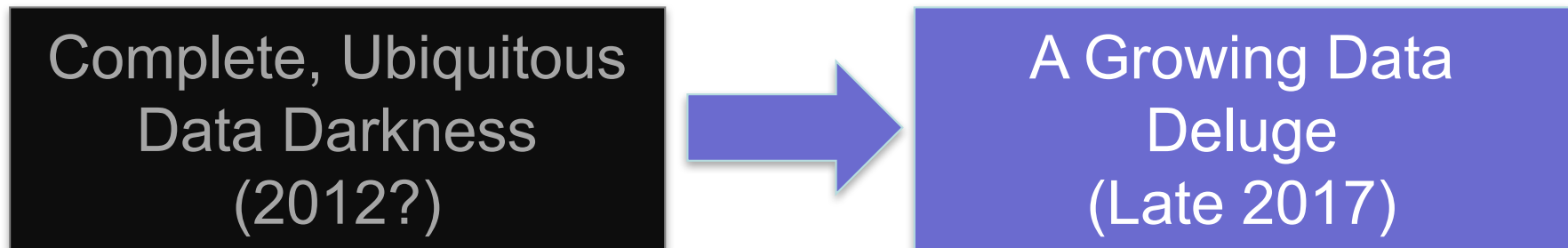
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A Primer on Parsimonious Health Information Systems for Low- and Middle-Income Countries

- In a stunningly short period, LMICs have moved:



- LMICs and the global health community have all contributed greatly to these advances.
 - But many changes are coming from outside.
 - The pent-up demand for information is advancing even faster than supply.

And so ...

- We have confusion/lack of understanding.



Five Top Global Drivers of LMIC HIS

1. Ubiquitous digital identification

- People, places, things, funds

Vastly More
Transactional
Detail

2. Mobile phones, payments, fintech, working capital.

3. Master data

4. Health information systems/exchange

- Parsimonious, interoperable, integrated ...
- “Collect once, use many”

Vastly More
Structured
Data

5. High-volume care business models

- Scale! Just as elsewhere → Amortize fixed costs.
- Care coordination as the critical component.

Vastly More
Economic
Opportunities



What is Unfolding is NOT “Big Data”

- Yes, the volume of data grows exponentially. But ...
 - The data are highly structured (e.g., diagnosis codes).
 - A growing prioritization of “lean” information systems.
 - ✓ Operate HIS within very tight resource constraints.
 - ✓ Do not burden frontline health workers or others.
 - ✓ Do not intrude un-necessarily in the lives of others.
 - ✓ Do not collect data that are not needed or used.
 - ✓ Keep it simple! (Dashboards, Key performance indicators, ...)
 - ✓ No strong reliance on artificial intelligence, machine learning.
 - ✓ “Collect once, use many.”
 - Overall data volumes will remain tractable.



About the Primer

Describes all in one place the individual data assets and systems that together comprise the working foundations of health information systems (HIS).

- What specific data fields?
 - How do these track clinical and operational workflow?
 - How do these data all connect?
- Broad/non-technical audience
 - No prerequisites; moves quickly
 - Comprehensive & up-to-date
 - Footnotes: A trove of readings.
- Integrate key outside forces
 - Fintech, Internet of things, ...
- At 30,000 words, it's long!
 - Roughly 40% of the length of a full college textbook.
- To what ends?
 - Provide historical context.
 - Educate and integrate all stakeholders in HIS decisions. (We must all have a voice!)
 - Build urgency and hope.
 - Guide decision-making.



What Does HIS Span?

A: Everything!

Individual Patient and Care Provider Information

- Problem-Oriented Electronic Medical Record (EMR)
- Human Resource Information Systems (HRIS)
- Master Facility Lists (MFL)
- Property, Plant, and Equipment (PPE)
- Home-Based Paper Records (HBR)

Information Directly Supporting Care Delivery

- **Pharmacy** Info Systems (PIS)
- **Laboratory** Info Systems (LIS)
- **Immunization** Info Systems (IIS)
- **Radiology** Info Systems (RIS) and Picture Archiving and Communication Systems for Filmless Imaging (PACS)

MoHs: Public and Population Health Information

- Civil Registration and Vital Statistics (CRVS)
- Household Surveys
- Population Surveillance
- Global Health Indexes (WHO, SDGs, ...)
- Patient Registries, Panels, and Censuses



What Does HIS Span?

A: Everything!

Financial and Administrative Information

- Administrative Claims/Methods for Cost Recovery
- Facility Health Management Info Systems (HMIS)
- Mobile Payments, Fee-for-Service Claims Adjudication/Financial Intermediation

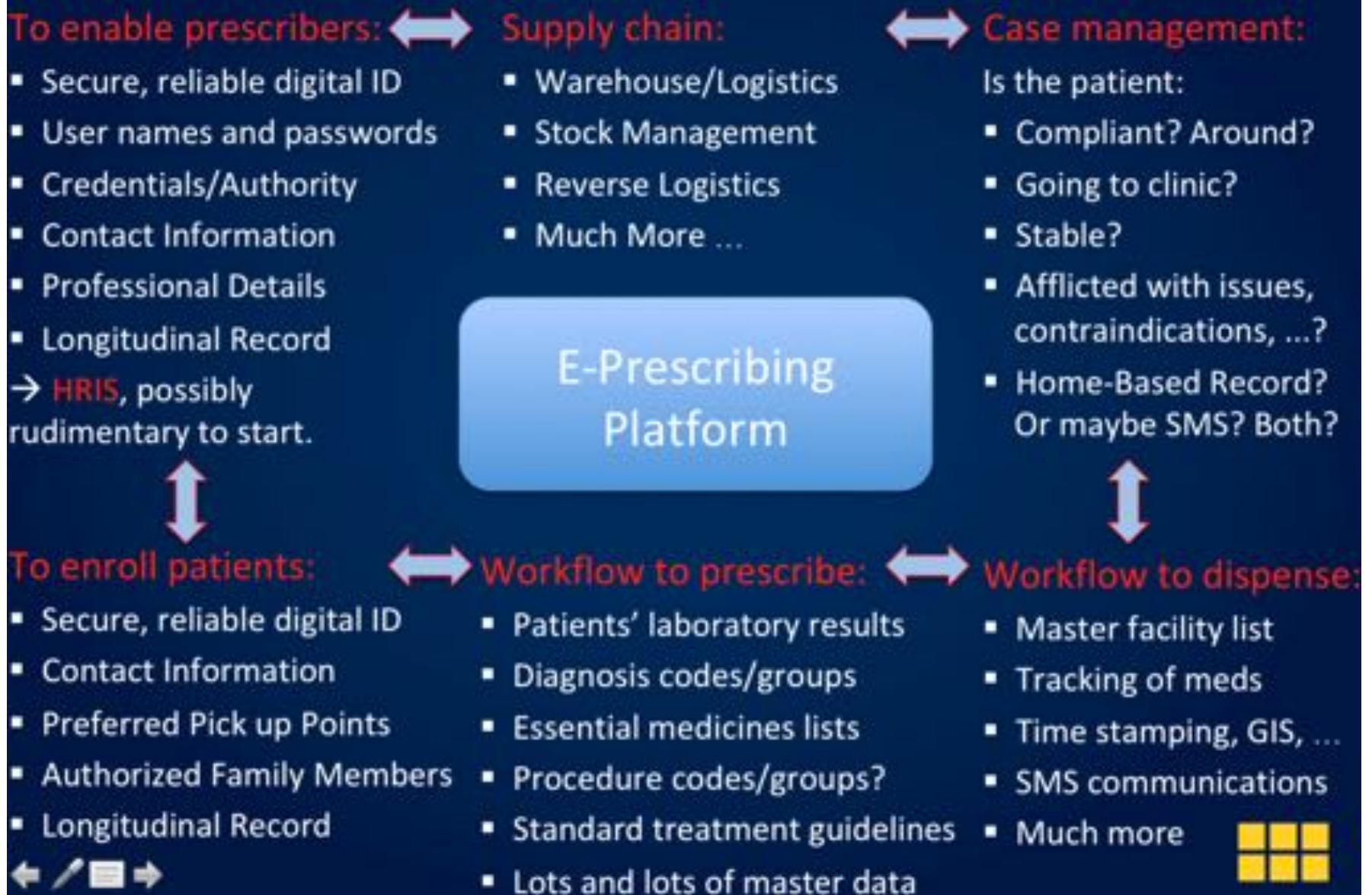
Supply Chain Information

- Logistics Management Info Systems (LMIS)
- Health Commodities Supply Chain Control Towers and Visibility Analytics Networks (VAN)

Imported and Manufactured Information

- Master Data
- Hierarchical and Metadata
- Census Data
- International Classification of Diseases (ICD10)
- GS1 (Barcoding)
- GIS
- HL7, SNOMED, LOINC

HIS Integration: Consider e-Prescribing, with Pick Up Points (PUPs)



Where the HIS Effort Stands

Current Stage: Build HIS Elements

- Design, budget, code the individual components (e.g., LMIS, HMIS, ...).
- Integrate with underlying workflow.
- Add master data, IP, detail, ...
- Document all.



Impressive!
Even bigger returns
lie just ahead ...

Imminent: Link/“Interoperate”

- Nearly all ahead of us/urgent.
- This involves so much more than “joining up” disparate data sets.
- Ongoing operations, access, governance & security, funding, ...
- Again, document.



Daunting!
Will require broad-
based discussions.

Historically, LMIS have not had visibility to transactional detail

- No actionable data at the patient or prescriber level.
- Organize LMIS around stock: We only see that far!
- What happens once we can track every detail?
 - What was each patient dispensed?
 - For what medical necessity?
 - Based on what evidence?
 - Who prescribed/dispensed it?
 - Where?
 - What adverse outcomes?



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What if our LMIS are not presently able to link to other HIS components?

What if few of us are yet thinking “patient-centered?”

Can we redesign SCs without engaging other stakeholders?



After Interoperating

Stage 3: Integrate HIS Components

- How do we think of these together?
- Add master data, IP, detail, ...
- *Improve* the underlying workflow.
- Document all.

Ongoing,
iterative, multi-
stakeholder.

Grand Aim: Ubiquitous Exchange

- “Collect once, use many.”
- An open question ...
- For example, how “lean?”
- The answers are not “scientific.”
- All of us together make principled choices/priorities.

Data assets.
Empowering.
System-altering.

Another example:
Better Immunization Data (BID) Initiative



What Else Does the Primer Hold?

1. Modest details of clinical/operational workflow.
2. Brief technological/economic landscape analysis:
 - Which organizations/software for each component?
 - How much recent progress? Near-term prospects? Roadblocks?
3. Paper-based versus electronic records
 - The limits of paper-based records. Benefits of electronic.
 - Priorities in migrating from paper-based to electronic records.
 - Co-existence/synergies of paper-based and electronic records.
4. Introduction to relational databases/master data/...
 - A “how to” for interoperability. Tables of tables.
 - Automated data entry.
5. Outside forces: Fintech, internet of things, care bundles, ...
6. Practical aspects of patient-centered systems.



What Actions Should We Each Take?

- Few organizations can have commanding expertise across all of these HIS components.
- And from beginning to end:
 - Building
 - Interoperating
 - Integrating
 - Health Information Exchange
- Where is WDI's focus?



Asserting WDI's HIS Core Competencies



1. Health Information Exchange (End User Facing)

2. Master Data, Public Domain IP, Data Standardization

3. Patient-Centered Commodities Supply Chains & Care Delivery Systems



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Conclusions

- The global health community is undergoing a data and information systems revolution. Are we keeping up?
- Lean health information systems offer extraordinary near-term opportunities. Two promising models:
 - South Africa’s Central Chronic Medicines Dispensing and Distribution (CCMDD) Programme/e-Prescribing/PUPs.
 - The BID Initiative, Starting in Zambia and Tanzania (vaccines)
- There is great urgency in designing and planning the future.
- There is no “one best way” to proceed. We need all key stakeholder communities to join in the effort.



Thank you!

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